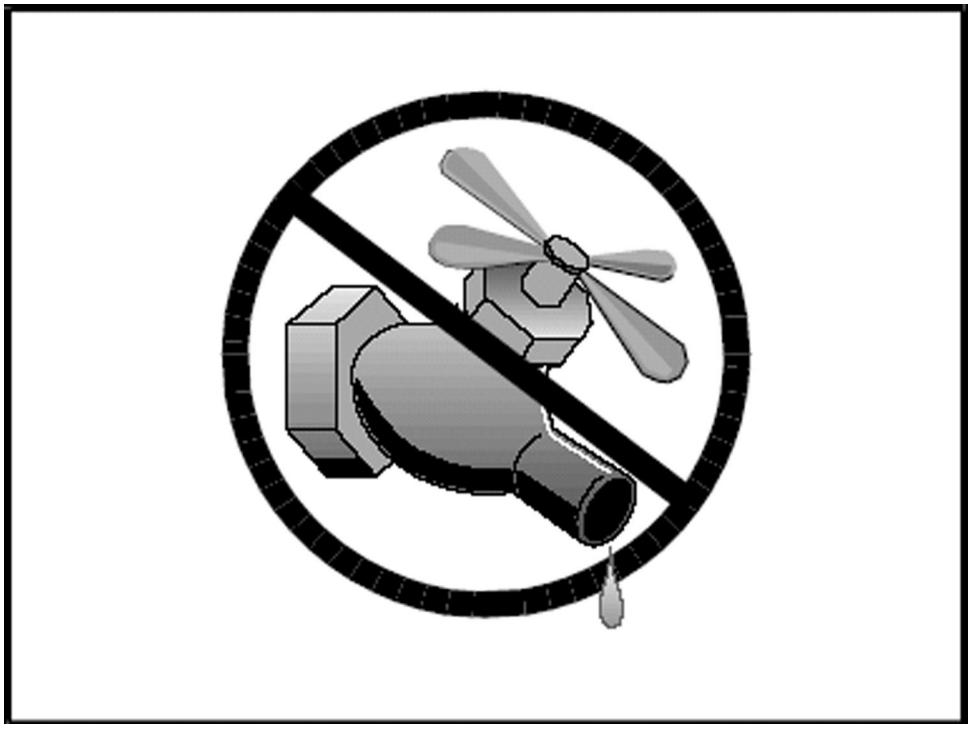
5.6 NON-STORM WATER BEST MANAGEMENT PRACTICES

Non-storm water management Best Management Practices are source control BMPs that prevent pollution by limiting or reducing potential pollutants at their sources before they come in contract with storm water. These practices involve day-to-day operations of the construction site and are usually under the control of the contractor. These BMPs are also referred to as "good housekeeping practices", which involve keeping a clean, orderly construction site and include the following:

Water Conservation Practices



5.6.1 Water Conservation Practices

Definition

Procedures nd practices that minimize the harmful affects to water and water quality during the construction of a project.

Purpose

- To conserve and protect a critical resource.

Appropriate Applications

Project Design

- Limit as much as possible changes to the natural patterns of water movement.
- Limit as much as possible the amount of impervious surfaces added to the site.
- Consider the use of multiple small water management practices that can be implemented as close to the point where water comes in contact with newly cleared land as possible.

Project Construction

- Direct construction water runoff to areas where it can soak into the ground.
- Manage runoff as close to the source as possible.
- Look for ways to conserve wherever water is used on a project.

Standards and Specifications

- Use alternative methods for dust control and cleaning of construction areas to avoid the use of water.
- Avoid using water to clean construction areas.
- Use water harvesting techniques to water areas that are being revegetated.

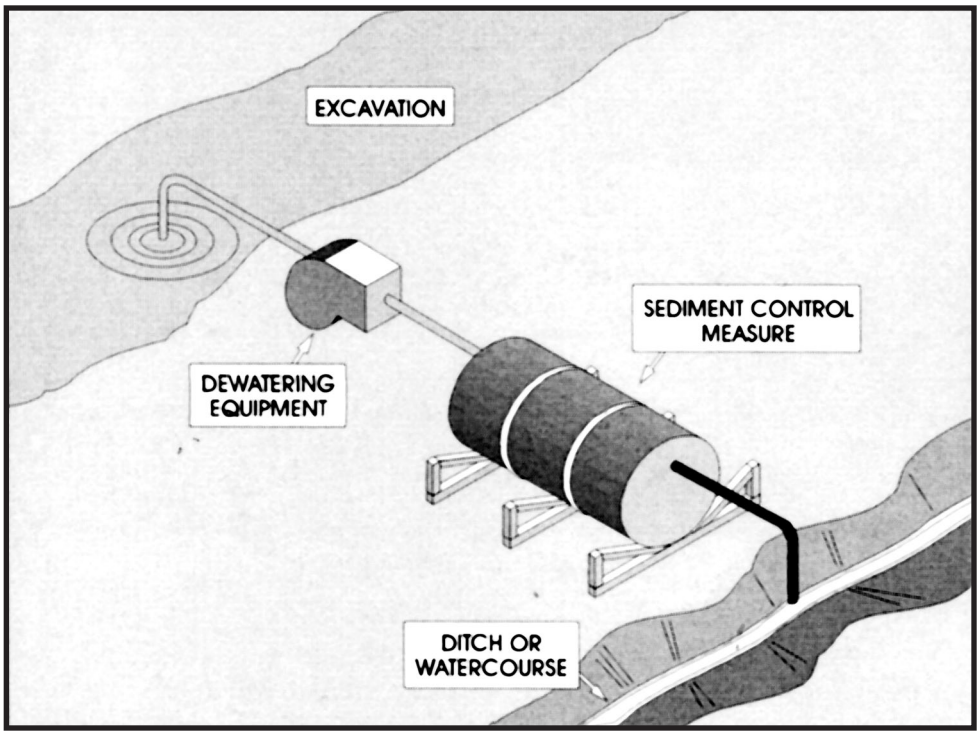
Inspections

- Inspect water equipment for leaks at least weekly.

Maintenance

- Keep water equipment in good working condition.
- Repair leaks promptly.

Dewatering Operations



5.6.2 Dewatering Operations

Definition and Purpose

Dewatering operations are practices that manage the discharge of pollutants from groundwater and accumulated precipitation dewatering operations.

Appropriate Applications

These practices are implemented where groundwater or accumulated precipitation will be discharged from a construction site. Controlling sediment from dewatering operations is required on all projects that pump sediment-laden water from work areas and plan to discharge the pumped water into a conveyance system or water body. Dewatering discharges include but are not limited to:

- Removal of uncontaminated groundwater.
- Removal of accumulated rainwater from work areas.
- Removing water from cofferdams or diversions.

Limitations

- Site conditions will dictate design and use of dewatering operations.
- The controls discussed in this BMP address sediment only. If the presence of polluted water is identified in the contract, the contractor shall implement dewatering pollution controls as required by the contract documents. If the quality

of water to be removed by dewatering is not identified as polluted in the contract documents, but is later determined by observation or testing to be polluted, the contractor shall notify the Engineer and comply with Standards Specifications, "Differing Site Conditions."

- The controls detailed in this BMP only allow for minimal settling time for sediment particles. Use only when site conditions restrict the use of the other control methods.
- Dewatering operations will require and must comply with applicable local permits.
- Avoid dewatering discharges where possible by using the water for dust control, by infiltration, etc.

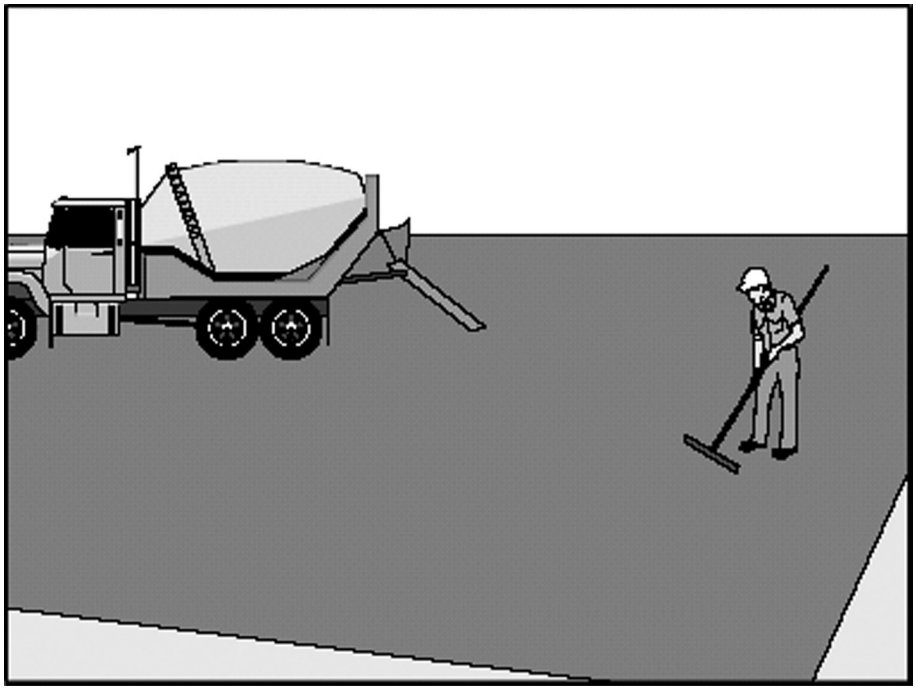
Standards and Specifications

- Contractor shall notify the Engineer of planned discharges.
- The Engineer will coordinate monitoring and permit compliance.
- Discharges must comply with regional and watershed-specific discharge requirements.
- Ensure that dewatering discharges do not cause erosion at the discharge point.
- Sediment Control Treatment: Dewatering effluent (groundwater and accumulated precipitation) that is laden with suspended solids shall be treated by a device designed to remove soil particles down to 0.02 mm in size. Desilting basins (see BMP) are an example of a temporary treatment device.
- A filtration devise may be substituted for a desilting basin if the contractor can demonstrate to the Engineer's satisfaction that the filtration devices provides equivalent or greater removal of suspended solids than the basin.
- Filter bags may be used for small-scale dewatering operations.

Inspection and Maintenance

- Inspect filtering device frequently and repair or replace once the sediment build-up prevents the structure from functioning as designed.
- Accumulated suspended solids removed from a dewatering device shall be spread on the project site and stabilized at locations designated by the Engineer or shall be properly disposed of outside the highway right of way in conformance with the Standard Specifications.

Paving and Milling Operations



5.6.3 Paving and Milling Operations

Definition

Procedures implemented during paving surfacing, resurfacing, or sawcutting to reduce or eliminate pollution of storm water.

Purpose

- Water use during paving and milling operations can contain pollutants and must not be allowed to enter storm water systems or drainage ways.

Appropriate Applications

- These procedures are implemented where paving, surfacing, resurfacing, or sawcutting, may pollute storm water runoff or discharge to the storm drain system or watercourses.

Limitations

- Finer solids are not effectively removed by filtration systems.
- Paving opportunities may be limited during wet weather.

Standards and Specifications

- Substances used to coat asphalt transport trucks and asphalt trucks and asphalt

spreading equipment shall not contain soap and shall be non-foaming and non-toxic.

- Place drip pans or absorbent materials under paving equipment while not in use, to catch and/or contain drips and leaks.
- When paving involves asphaltic concrete (AC), the following steps shall be implemented to prevent the discharge of milling residue, uncompacted or loose AC, tack coats, equipment cleaners, or unrelated paving materials:
- Minimize the washing of sand or gravel from new asphalt into storm drains, streets, and creeks by sweeping where practical.
- Old or spilled asphalt must be disposed as approved by the Engineer.
- AC millings, pieces, or chunks used in embankments or shoulder backing must not be allowed to enter any storm drains or watercourses. Apply temporary BMP perimeter controls until structure is stabilized or permanent controls are in place.
- Collect and remove all broken asphalt and recycle when practical; otherwise, dispose in accordance with special provisions or as directed by the Engineer.
- Any AC chunks and pieces used in embankments must be placed above the water table and covered by at least 1 foot of material.
- Use only non-toxic substances to coat asphalt transport trucks and asphalt spreading equipment.
- Drainage inlet structures and manholes shall be covered with filter fabric during application of seal coat, tack coat, slurry seal, and/or fog seal.
- Seal coat, tack coat, slurry seal, or fog seal shall not be applied if rainfall is predicted to occur during the application or curing period.
- Clean asphalt coated equipment off-site whenever possible. When cleaning dry, hardened asphalt from equipment, manage hardened asphalt debris as described in BMP "Solid Waste Management". Any cleaning on site shall follow BMP "Vehicle and Equipment Cleaning".
- Do not wash sweepings from exposed aggregate concrete into storm drain system. Collect and return aggregate base stockpile, or dispose of properly.
- Allow aggregate rinse to settle. Then, either allow rinse water to dry in a temporary pit as described in BMP "Concrete Waste Management" or pump the water to the sanitary sewer if allowed by the local wastewater authority.
- Do not allow saw-cut Portland Concrete Cement (PCC) slurry to enter storm drains or watercourses. Residue from milling operations shall not be allowed to flow across the pavement, and shall not be left on the surface of the pavement. See also BMP "Concrete Waste Management" and BMP "Liquid Waste Management".

- When approved by the Engineer, stockpile material removed from roadways away from drain inlets, drainage ditches, and watercourses.
- Disposal of PCC and AC waste shall be in conformance with the Standard Specifications. See also BMP "Concrete Waste Management".

Thermoplastic Striping

- All thermoplastic striper and pre-heater equipment shutoff valves shall be inspected to ensure that they are working properly to prevent leaking thermoplastic from entering drain inlets, the storm water drainage system, or watercourses.
- The pre-heater shall be filled carefully to prevent splashing or spilling of hot thermoplastic. Leave 6 inches of space at the top of the pre-heater container when filling thermoplastic to allow room for material to move when the vehicle is deadheaded.
- Contractor shall not pre-heat, transfer, or load thermoplastic near drain inlets or watercourses.
- Clean truck beds daily of loose debris and melted thermoplastic. When possible recycle thermoplastic material. Thermoplastic waste shall be disposed of in accordance with project specifications.

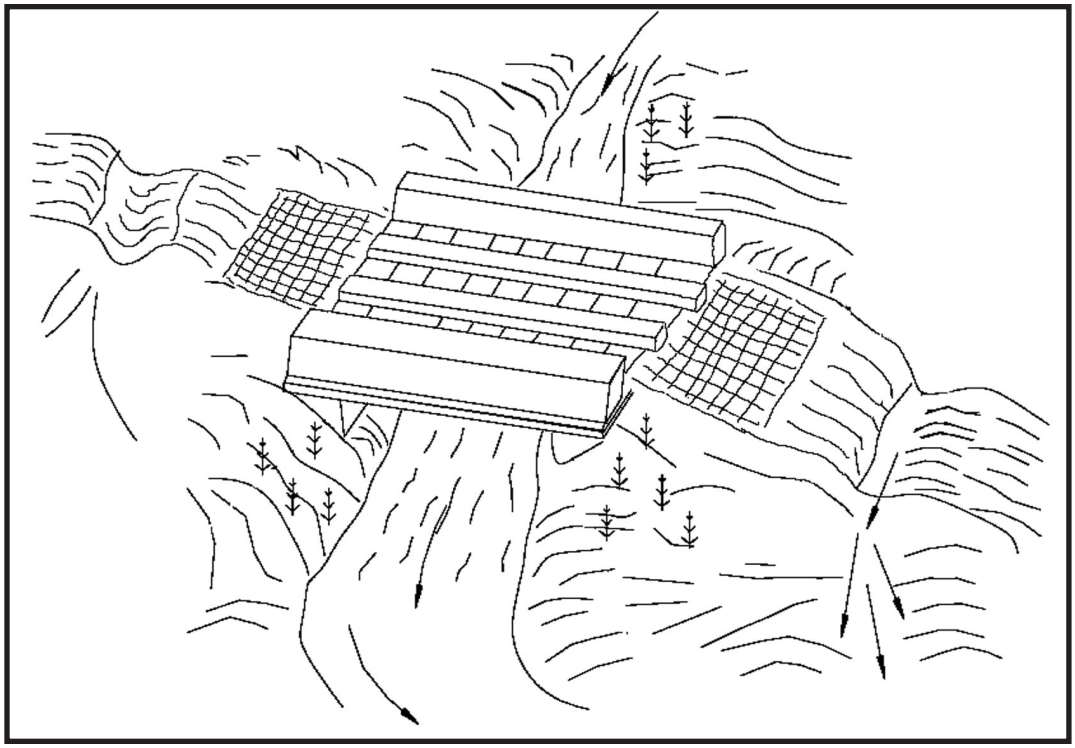
Raised/Recessed Pavement Marker Application and Removal

- Do not transfer or load bituminous material near drain inlets, the storm water drainage system or watercourses.
- Melting tanks shall be loaded with care and not filled to beyond six inches from the top to leave room for splashing when vehicle is deadheaded.
- When servicing or filling melting tanks, ensure all pressure is released before removing lids to avoid spills.
- On large-scale projects, use mechanical or manual methods to collect excess bituminous material from the roadway after removal of markers.
- Waste shall be disposed of in accordance with Standard Specification.

Maintenance and Inspection

- Inspect and maintain machinery regularly to minimize leaks and drips.
- Ensure that employees and subcontractors are implementing appropriate measures during paving operations.
- Maintain machinery regularly to minimize leaks and drips.

Temporary Stream Crossings



5.6.4 Temporary Stream Crossing

Definition

A structure that is placed across a waterway that allows vehicles to cross the waterway during construction.

Purpose

- To eliminate erosion and downstream sedimentation caused by vehicles moving through the streambed.

Appropriate Applications

- In all cases where construction equipment or vehicles need to frequently cross a waterway or as specified in ADOT Stored Specification 104SWDEQ or 104SWEPA.
- When alternative access routes are not feasible.
- When crossing perennial streams or waterways causes significant erosion.

Limitations

- Installation and removal will disturb the waterway.
- May require additional permitting such as U.S. Army Corps of Engineers 404 permit and environmental clearance.

- Installation may require dewatering or temporary diversion of the stream. See BMP "Dewatering Operations".
- May become a constriction in the waterway, which can obstruct flood flow and cause flow backups or washouts. If improperly designed, flow backups can increase the pollutant load through washouts and scouring.

Standards and Specifications

General Considerations

Location of the temporary stream crossing shall address:

- Site selection where erosion potential is low.
- Areas where the side slopes from highway runoff will not spill into the side slopes of the crossing.

The following types of temporary stream crossings shall be considered:

- Culverts – Used on perennial and intermittent streams.
- Fords – Appropriate during the dry season in arid areas. Used on dry washes and ephemeral streams. Avoid use on perennial streams.
- Bridges – Appropriate for streams with high flow velocities, steep gradients and/or where temporary restrictions in the channel are not allowed.
- Must allow for storm event-generated runoff.

Design and installation requires knowledge of stream flows and soil strength. Designs shall be prepared under direction of, and approved by, a registered civil and/or structural engineer. Both hydraulic and construction loading requirements shall be considered with the following:

- Comply with the requirements for culvert and bridge crossings, as contained in the ADOT Highway Design Manual, particularly if the temporary stream crossing will remain through the rainy season.
- Provide stability in the crossing and adjacent areas to withstand the design flow. The design flow and safety factor shall be selected based on careful evaluation of the risks due to over topping, flow backups, or washout.
- Install sediment traps immediately downstream of crossings outside of the drainage in order to capture sediments. See BMP "Sediment Trap".
- Avoid oil or other potentially hazardous waste materials for surface treatment.

Temporary Stream Crossings

Construction Considerations

- Stabilize construction roadways, adjacent work area and stream bottom against erosion.
- Construct during dry periods to minimize stream disturbance and reduce costs.
- Construct at or near the natural elevation of the streambed to prevent potential flooding upstream of the crossing.
- Vehicles and equipment shall not be driven, operated, fueled, cleaned, maintained, or stored in the wet or dry portions of a water body where wetland vegetation, riparian vegetation, or aquatic organisms may be destroyed, except as authorized by the Engineer as necessary to complete the work.
- Temporary water body crossings and encroachments shall be constructed to minimize scour. Cobbles used for temporary water body crossings or encroachments shall be clean, rounded river cobble.
- The exterior of vehicles and equipment that will encroach on the water body within the project shall be maintained free of grease, oil, fuel, and residues.
- Disturbance or removal of vegetation shall not exceed the minimum necessary to complete operations. Precautions shall be taken to avoid damage to vegetation by people or equipment.
- Riparian vegetation, when removed pursuant to the provisions of the work, shall be cut off no lower than ground level to promote rapid re-growth. Access roads and work areas built over riparian vegetation shall be covered by a sufficient layer of clean river run cobble to prevent damage to the underlying soil and root structure. The cobble shall be removed upon completion of project activities.
- Any temporary artificial obstruction placed within flowing water shall only be built from material, such as clean gravel or sandbags, which will cause little or no siltation.

Specific Considerations

- Culverts are relatively easy to construct and able to support heavy equipment loads.
- Fords are the least expensive of the crossings, with maximum load limits.
- Temporary fords are not appropriate if construction will continue through rainy season, if thunderstorms are likely, or if the stream is perennial.
- Bridges are generally more expensive to design and construct but provides the least disturbance of the stream bed and constriction of the waterway flows.
- Refer to Stored Specification 104SWDEQ or 104SWEPA for design and sizing criteria.

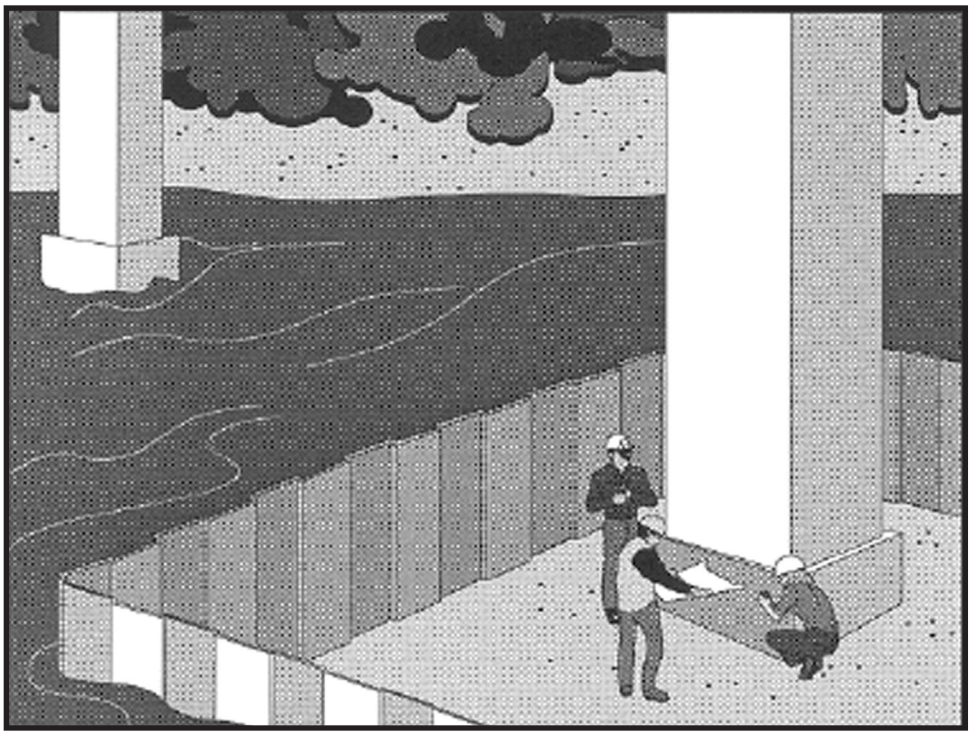
Inspections

- Inspect periodically to ensure that the bridge, streambed, and banks are maintained and not damaged.

Maintenance

- Maintenance shall be performed, as needed to ensure that the structure, streambed and banks are stable.

Clear Water Diversion



5.6.5 Clear Water Diversion

Definition and Purpose

- Clear water diversion consists of a system of structures and measures that intercept clear surface water runoff upstream of a project site, transport it around the site, and discharge it downstream with minimal water quality degradation for either the project construction operations or the construction of the diversion. Structures commonly used as part of this system include diversion ditches, berms, dikes, slope drains, drainage, and interceptor swales.

Appropriate Applications

- Implemented where appropriate permits have been secured and work must be performed in a running stream or water body.

Limitations

- Diversion/encroachment activities will usually disturb the waterway during installation and removal of diversion structures.
- Specific permit requirements or mitigation measures, such as Corps, Arizona Department of Game & Fish, Federal Emergency Management Agency (FEMA), etc. may be included in contract documents because of clear water diversion/ encroachment activities.

- Diversion/encroachment activities may constrict the waterway, which can obstruct flood flows and cause flooding or washouts.

Standards and Specifications

General

- Where working areas encroach on live streams, barriers adequate to prevent the flow of muddy water into streams shall be constructed and maintained between working areas and streams. During construction of the barriers, muddying of streams shall be held to a minimum.
- Diversion structures must be adequately designed to accommodate fluctuations in water depth or flow volume due to storms, flash floods, etc.
- Heavy equipment driven in wet portions of a water body to accomplish work shall be completely clean of petroleum residue, and water levels are below the gear boxes of the equipment in use, or lubricants and fuels are sealed such that inundation by water shall not result in leaks.
- Mechanical equipment operated in the water shall not be submerged to a point above any axle of said mechanical equipment.
- Excavation equipment buckets may reach out into the water for the purpose of removing or placing fill materials. Only the bucket of an excavator/backhoe may operate in a water body. The main body of the crane/excavator/backhoe shall not enter water-covered portions of a water body, except as necessary to cross the stream to access the work site.
- Stationary equipment such as motors and pumps, located within or adjacent to a water body, shall be positioned over drip pans.
- When any artificial obstruction is being constructed, maintained, or placed in operation, sufficient water shall, at all times, be allowed to pass downstream to maintain aquatic life downstream.
- The exterior of vehicles and equipment that will encroach on a water body within the project shall be maintained free of grease, oil, fuel, and residues.
- Disturbance or removal of vegetation shall not exceed the minimum necessary to complete operations. Precautions shall be taken to avoid damage to vegetation by people or equipment.
- Riparian vegetation, when removed pursuant to the provisions of the work, shall be cut off no lower than ground level to promote rapid re-growth. Access roads and work areas built over riparian vegetation shall be covered by a sufficient layer of clean river run cobble to prevent damage to the underlying soil and root structure.

The cobble shall be removed upon completion of project activities. Drip pans shall be placed under all vehicles and equipment placed on structures over water bodies when the vehicle or equipment is planned to be idle for more than one hour.

- Where possible, avoid or minimize diversion/encroachment impacts by scheduling construction during periods of low flow or when the stream is dry. See also the project special provisions for scheduling requirements.
- Scheduling shall also consider seasonal releases of water from dams, seasonal riparian wildlife, and water demands due to crop irrigation.
- Construct diversion structures with materials free of potential pollutants such as soil, silt, sand, clay, grease, or oil. If sandbags are used, they shall be filled with clean materials free of silt, clay, and organic substances.

Temporary Diversions/Encroachments

- Construct diversion channels in accordance with BMP "Earth Dikes/Drainage Swales".
- In high flow velocity areas, stabilize slopes of embankments and diversion ditches using an appropriate liner, in accordance with BMP "Geotextiles, Plastic Covers and Erosion Control Blankets/ Mats", or, use rock slope protection, as described in the Standard Specifications Section.
- Where appropriate, use natural streambed materials such as large cobbles and boulders for temporary embankment/slope protection, or other temporary soil stabilization methods.
- Provide for velocity dissipation at transitions in the diversion, such as the point where the stream is diverted to the channel and the point where the diverted stream is returned to its natural channel. See also BMP "Rock Outlet Protection".

Temporary Dry Construction Areas

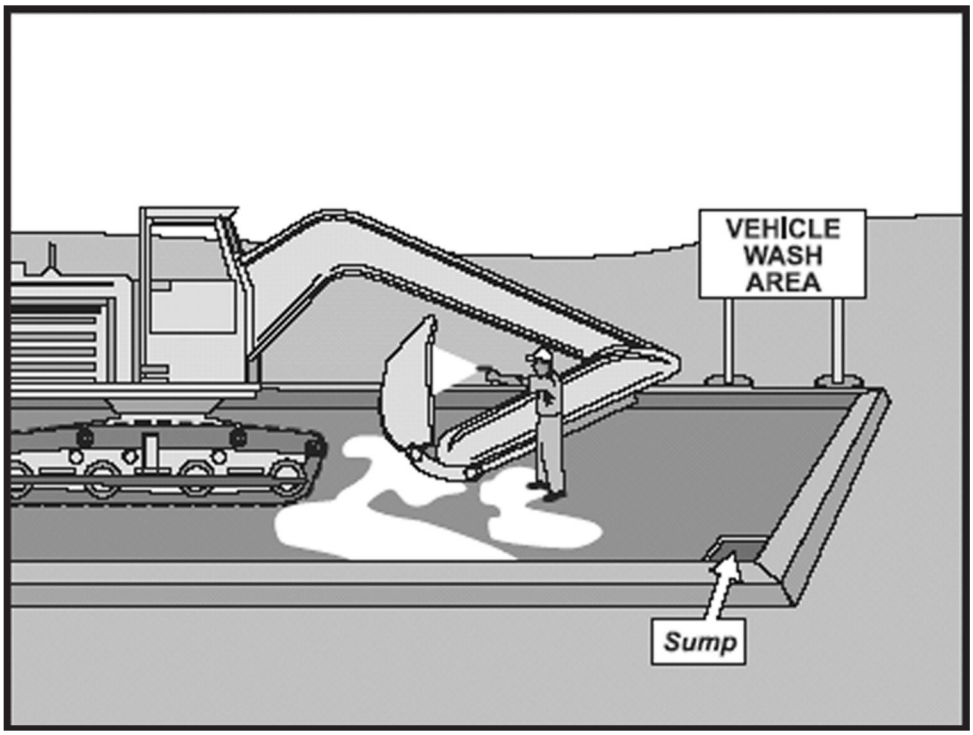
- When dewatering behind temporary structures to create a temporary dry construction area, such as coffer dams, pass pumped water through a sediment settling device, such as a portable tank or settling basin, before returning water to the water body. See also BMP "Dewatering Operations".
- If the presence of polluted water or sediment is identified in the contract, the contractor shall implement dewatering pollution controls as required by the contract documents. If the quality of water or sediment to be removed while dewatering is not identified as polluted in the contract documents, but is later determined by observation or testing to be polluted, the contractor shall notify the Engineer and comply with the Standard Specifications.

- Any substance used to assemble or maintain diversion structures, such as form oil, shall be non-toxic and non-hazardous.
- Any material used to minimize seepage underneath diversion structures, such as grout, shall be non-toxic, non-hazardous, and as close to a neutral pH as possible.

Maintenance and Inspection

- Inspect diversion/encroachment structures before and after significant storms, and at least once per week while in service.

Vehicle and Equipment Cleaning



5.6.6 Vehicle and Equipment Cleaning

Definition

Procedures and practices used to clean vehicles and equipment prior to or during use on project site.

Purpose

- Minimize or eliminate the discharge of pollutants from vehicle and equipment cleaning operations to storm drain or to watercourses.
- Reduce or eliminate spread of noxious weeds and invasive plant species from project site.

Appropriate Applications

- These procedures are applied on all construction sites where vehicle and equipment cleaning is performed.

Standards and Specifications

- On-site vehicle and equipment washing is discouraged, but may be necessary to eliminate spread of invasive species to areas outside of project site.
- Cleaning of vehicles and equipment with soap, solvents or steam shall not occur on the project unless the Engineer has been notified in advance and the resulting

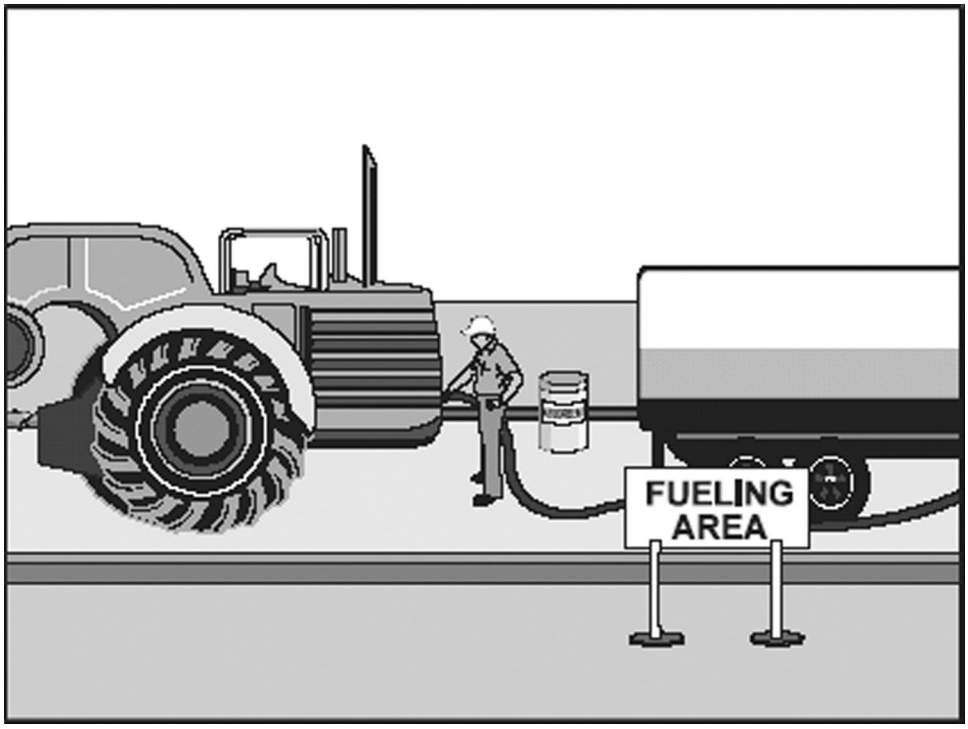
wastes are fully contained and disposed of outside of the highway right-of-way in conformance with the Standard Specifications. Resulting wastes shall not be discharged or buried within the highway right-of-way.

- When equipment/vehicle washing/cleaning must occur on-site and the operation cannot be located within a structure or building equipped with appropriate disposal facilities, the outside cleaning shall have the following characteristics and shall be arranged with the Erosion Control Coordinator:
  - A washout area shall be an excavated pit, which will later be backfilled or where the concrete wash can harden and be properly disposed of.
  - Locate wash out areas close to the active construction site on the project.
  - Locate wash out pits away from storm drains, open ditches, or receiving waters.
  - Use only when necessary.
  - When cleaning vehicles/equipment with water:
  - Use as little water as possible. Consider using high pressure sprayers, which require less water.

Maintenance

- Inspect sump regularly and remove liquids and sediment as required or as directed by the Engineer.

Vehicle and Equipment Fueling



5.6.7 Vehicle and Equipment Fueling

Definition

Procedures and practices to minimize or eliminate fuel spills and leaks during fueling.

Purpose

- To prevent the pollution of storm drain systems or watercourses from fuel spills and leaks.

Appropriate Applications

- These procedures are applied on all construction sites where vehicle and equipment fueling takes place.

Limitations

- Only use on-site vehicle and equipment fueling when it is impractical to send vehicles and equipment off-site to be refueled.

Standards and Specifications

- When fueling must occur on-site, the contractor shall select and designate an area to be used, subject to approval by the Engineer.

- Federal, state and local requirements shall be observed for any stationary aboveground storage tanks.
- Mobile fueling of construction equipment throughout the site shall be minimized. Whenever practical, equipment shall be transported to the designated fueling area.
- Spill prevention, containment and countermeasures shall be included in the SWPPP if the volume of projectsite fuel in a single container exceeds 660 gallons, or if the total fuel storage volume at any one site exceeds 1,320 gallons.
- Designated fueling areas shall be protected from storm water runoff and shall be located at least 50 feet from downstream drainage facilities or watercourses. Fueling must be performed on level-grade areas.
- Protect fueling areas with berms and/or dikes to prevent runon, runoff and to contain spills.
- Absorbent spill clean-up materials and spell kits shall be available in fueling areas and on fueling trucks and shall be disposed of properly after use.
- Drip pans or absorbent pads shall be used during vehicle and equipment fueling, unless the fueling is performed over an impermeable surface in a dedicated fueling area.
- Nozzles used in vehicle and equipment fueling shall be equipped with an automatic shut-off to control drips. Fueling operations shall not be left unattended. Fuel tanks shall not be "topped off."

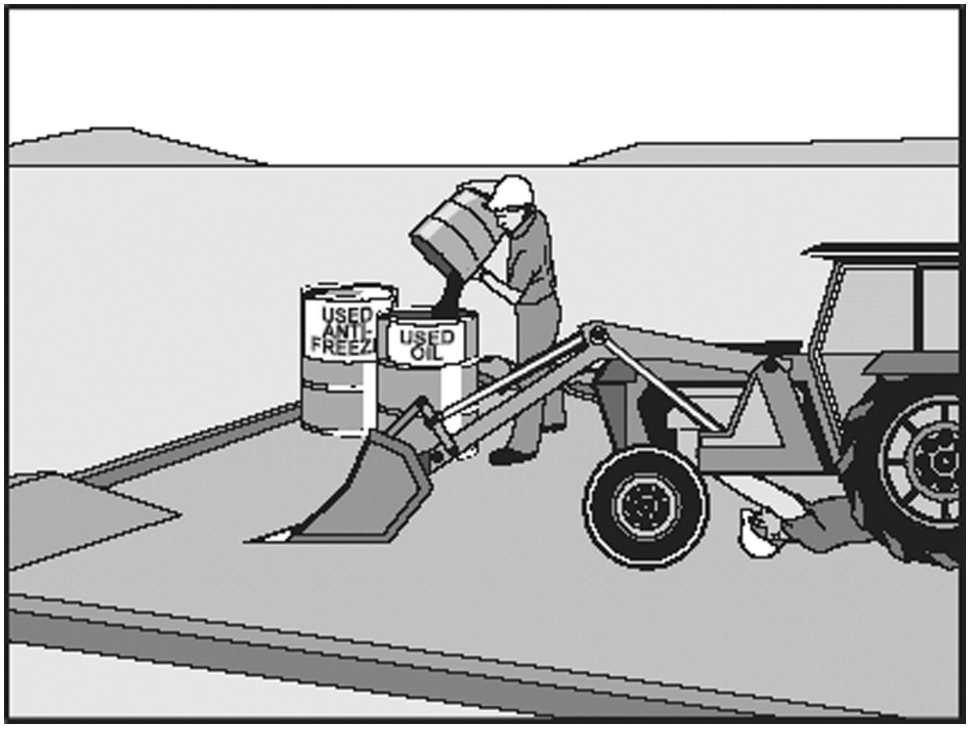
Inspections

- Vehicles and equipment shall be inspected daily for leaks. Leaks shall be repaired immediately or problem vehicles or equipment shall be removed from the project site.
- Fueling areas and storage tanks shall be inspected on a regular basis.

Maintenance

- Immediately clean up spills and properly dispose of contaminated soil and cleanup materials.
- Keep an ample supply of spill cleanup material on the site.

Vehicle and Equipment Maintenance



5.6.8 Vehicle and Equipment Maintenance

Definition

A program of equipment maintenance procedures and practices for the construction site.

Purpose

- To prevent the contamination of on-site soils and storm water.
- To insure the proper disposal of equipment fluids, and other vehicle maintenance debris.

Appropriate Applications

- On any construction site where heavy equipment and truck storage and maintenance yards are located on-site.

Limitations

- Comply with local codes and ordinances regarding the disposal of fluids and consumables, and the on-site maintenance of equipment.

Standards and Specifications

- Plan for the proper recycling or disposal of used oils, hydraulic fluids, gear lubricants, batteries, and tires.

- Use appropriate, leak-proof containers for fuels, oils and lubricants to provide for proper disposal.
- Use steam or high-pressure water instead of thinners and solvents to wash down equipment. Wash water and detergents can be disposed of in the sanitary sewer system after grit is removed, after checking with local authorities.
- Use drip pans or absorbent pads under equipment during maintenance that involves fluids.
- Equipment maintenance and wash-out areas should be located at least 50 feet away from drainages.
- Provide spill containment areas around stored oil and chemical drums.
- Provide a contained wash-out area to wash down heavy equipment (Refer to BMP "Designated Wash-out Area").

Inspections

- Inspect equipment for damaged hoses and leaky gaskets, and repair or replace as needed.
- Inspect equipment maintenance areas and wash-out areas regularly.
- Inspect fluid containers for leaks.

Maintenance

- Repair leaky fluid containers immediately.